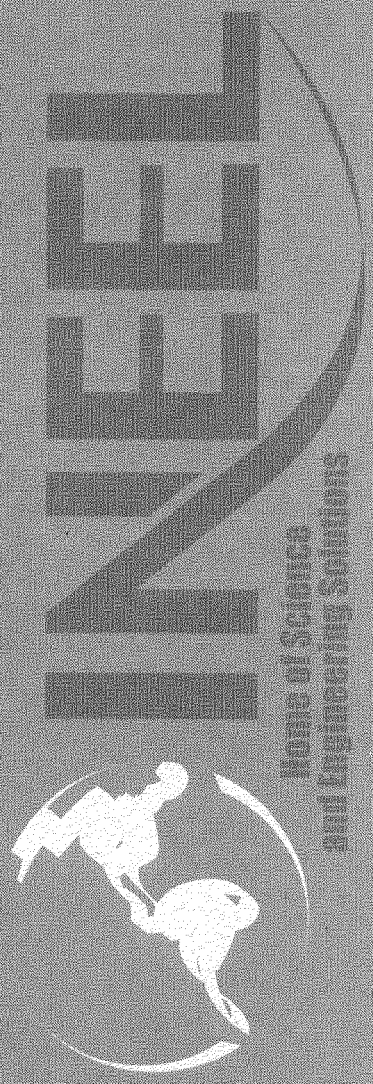
INEEL/EXT-02-00767
Revision 0

PROJECT NO. 021052

Waste Management Plan for the OU 7-10 Glovebox Excavator Method Project

January 2003



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Idaho National Engineering and Environmental Laboratory
Bechtel BWXT Idaho, LLC

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Waste Management Plan for the OU 7-10 Glovebox Excavator Method Project

January 2003

Idaho National Engineering and Environmental Laboratory
Environmental Restoration Program
Idaho Falls, Idaho 83415

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
Contract DE-AC07-99ID13727

Waste Management Plan
for the OU 7-10 Glovebox Excavator Method Project

INEEL/EXT-02-00767
~~(Formerly DOE/ID-10789)~~ 1/28/03 MW
Revision 0

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ABSTRACT

The purpose of this waste management plan is to describe methods for identifying, characterizing, and managing the waste streams associated with Operable Unit 7-10 Glovebox Excavator Method Project activities at the Subsurface Disposal Area within the Radioactive Waste Management Complex at the Idaho National Engineering and Environmental Laboratory. In addition, this plan discusses regulatory considerations and waste management assumptions and defines and identifies the waste streams associated with this project.

CONTENTS

FIGURES

TABLES

ACRONYMS

Anti-C	anticontamination
AOC	area of contamination
ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
D&D&D	deactivation, decontamination, and decommissioning
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
FFS	Facility Floor Structure
FSP	field sampling and analysis plan
HEPA	high-efficiency particulate air
H&V	heating and ventilation
HW	hazardous waste
HWD	hazardous waste determination
HWMA	Hazardous Waste Management Act
ICDF	INEEL CERCLA Disposal Facility
INEEL	Idaho National Engineering and Environmental Laboratory
IW	industrial waste
IWTS	Integrated Waste Tracking System
LDR	land disposal restriction
LLW	low-level waste
MCP	management control procedure

MLLW	mixed low-level waste
MTRU	mixed transuranic
OU	operable unit
PCB	polychlorinated biphenyl
PGS	Packaging Glovebox System
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
RCS	Retrieval Confinement Structure
RD/RA	remedial design/remedial action
RFP	Rocky Flats Plant
ROD	Record of Decision
RWMC	Radioactive Waste Management Complex
SDA	Subsurface Disposal Area
TBD	to be determined
TRU	transuranic
TSA	Transuranic Storage Area
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
UW	universal waste
WAC	waste acceptance criteria
WIPP	Waste Isolation Pilot Plant
WES	Weather Enclosure Structure
WGS	Waste Generator Services
WMP	waste management plan

Waste Management Plan for the OU 7-10 Glovebox Excavator Method Project

1. INTRODUCTION

The *Record of Decision: Declaration of Pit 9 at the Radioactive Waste Management Complex Subsurface Disposal Area at the Idaho National Engineering Laboratory* (DOE-ID 1993) specifies the environmental remediation of transuranic (TRU) waste from Operable Unit (OU) 7-10 (Pit 9) within the Subsurface Disposal Area (SDA) of the Radioactive Waste Management Complex (RWMC) at the Idaho National Engineering and Environmental Laboratory (INEEL). On October 1, 2001, the INEEL published the *Waste Area Group 7 Analysis of OU 7-10 Stage II Modifications* report (INEEL 2001), which identified a feasible approach for retrieving waste from OU 7-10. The OU 7-10 Glovebox Excavator Method Project was established to accomplish the objectives presented in that report. The overall objectives for the project are as follows:

- Demonstrate waste zone material retrieval
- Provide information on any contaminants of concern present in the underburden
- Characterize waste zone material for safe and compliant storage
- Package and store waste onsite, pending a decision on final disposition.

This waste management plan (WMP) describes the management of waste generated during project activities. This is a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 USC § 9601 et seq.) project conducted in agreement with the *Federal Facility Agreement and Consent Order for the Idaho National Engineering and Environmental Laboratory* (DOE-ID 1991). This project will be performed as part of implementing the *1993 Record of Decision* (ROD) (DOE-ID 1993) and the 1995 and 1998 Explanation of Significant Differences documents (DOE-ID 1995, 1998). This project includes demonstration of retrieval, examination, characterization, repackaging, and storage of buried TRU waste from OU 7-10.

1.1 Purpose and Scope

The purpose of this WMP is to describe methods for identifying, characterizing, and managing the waste streams associated with the project. The project involves the following activities:

1. Construction of retrieval system structures
2. Removal and staging of overburden soil
3. Retrieval, repackaging, characterization, and storage of limited quantities of waste from OU 7-10, including underburden sampling
4. Shutdown of the facility, which includes pit backfilling and immobilizing residual contamination
5. Layup of the facility, which entails monitoring, periodic maintenance, and inspection of equipment
6. Deactivation, decontamination, and decommissioning (D&D&D) of the project structures.

This plan addresses waste management considerations associated with waste from retrieval operations, as well as associated secondary waste streams, and addresses management of waste generated during the construction and dismantlement phases. Sampling, characterization, and D&D&D-related waste are addressed in this plan; however, waste projection details will be provided in the *OU 7-10 Field Sampling Plan* (Salomon et al. 2003) and the final D&D&D plan, respectively. In addition, limited quantities of waste zone materials will be provided to the OU 7-13/14 program for treatability study testing and characterization work. Because those testing details are not currently defined, associated waste management details will be included in separate OU 7-13/14 documentation. This WMP supports waste management planning requirements found in U.S. Department of Energy (DOE) orders and fulfills the scope requirements of the *Remedial Design/Remedial Action Scope of Work and Remedial Design Work Plan: Operable Unit OU 7-10 (Pit 9 Project Interim Action)* (LMITCO 1997).

2. SITE DESCRIPTION AND BACKGROUND

The INEEL is a DOE facility that occupies 2,305 km^2 (890 mi^2) of the northeastern portion of the Eastern Idaho Snake River Plain and is located 52 km (32 mi) west of Idaho Falls, Idaho. The U.S. Department of Energy Idaho Operations Office (DOE-ID) is responsible for the INEEL and the current management and operating contractor is Bechtel BWXT Idaho, LLC.

2.1 Site Description

The RWMC is a restricted-access area located 11.3 km (7 mi) southwest of the INEEL Central Facilities Area (CFA) in the southwestern portion of the INEEL (see Figure 1). The RWMC encompasses 580 ha (144 acres) and consists of two main disposal and storage areas: (1) the Transuranic Storage Area (TSA) and (2) the SDA. Within these areas are smaller, specialized disposal and storage areas.

The SDA is a 97-acre (39-ha) area located within the RWMC that is dedicated to permanent shallow-land disposal of solid low-level waste (LLW). Operable Unit 7-10 (Pit 9) is located in the northeast corner of the SDA and covers approximately 116 × 39 m (379 × 127 ft), as shown in Figure 2. Figure 3 provides the plot plan for the existing OU 7-10 area showing the infrastructure.

The TSA, a 23-ha (56-acre) area located in the southern section of the facility, is dedicated to the temporary storage of contact- and remote-handled solid TRU waste. In addition, the TSA contains the facility for the Advanced Mixed Waste Treatment Project Facility.

2.2 Site History

The RWMC was established in the early 1950s as a disposal site for solid LLW generated by INEEL operations. In addition, TRU waste generated by national defense programs was disposed of in the SDA from 1954 to 1970 and placed in storage from 1970 to the present. Radioactive waste materials have been buried at the SDA in underground pits, trenches, soil vault rows, and one aboveground pad (i.e., Pad A). The TSA provides interim storage of TRU waste in containers on asphalt pads. The TRU waste was received from the Rocky Flats Plant (RFP)[a] for disposal in the SDA from 1954 through 1970.

As described in the OU 7-10 ROD (DOE-ID 1993), waste was placed in OU 7-10 at the SDA from November 1967 to June 1969. The thickness of the SDA overburden averages approximately 6 ft. Approximately 250,000 ft^3 of overburden, 150,000 ft^3 of packaged waste, and 350,000 ft^3 of soil between and below the buried waste were present at the time of the OU 7-10 closure. The depth of OU 7-10 from ground surface to the bedrock is approximately 17.5 ft. No waste disposal has occurred in OU 7-10 since its closure in 1969.

In August 1987, the *Consent Order and Compliance Agreement* (DOE-ID 1987) was entered into between DOE and the U.S. Environmental Protection Agency (EPA) pursuant to the Resource Conservation and Recovery Act (RCRA) Section 3008(h) (42 USC § 6901 et seq.). The *Consent Order and Compliance Agreement* required DOE to conduct an initial assessment and screening of all solid and

a. The Rocky Flats Plant is located 26 km (16 mi) northwest of Denver. In the mid-1990s, it was renamed the Rocky Flats Environmental Technology Site. In the late 1990s, it was again renamed, to its present name, the Rocky Flats Plant Closure Project.

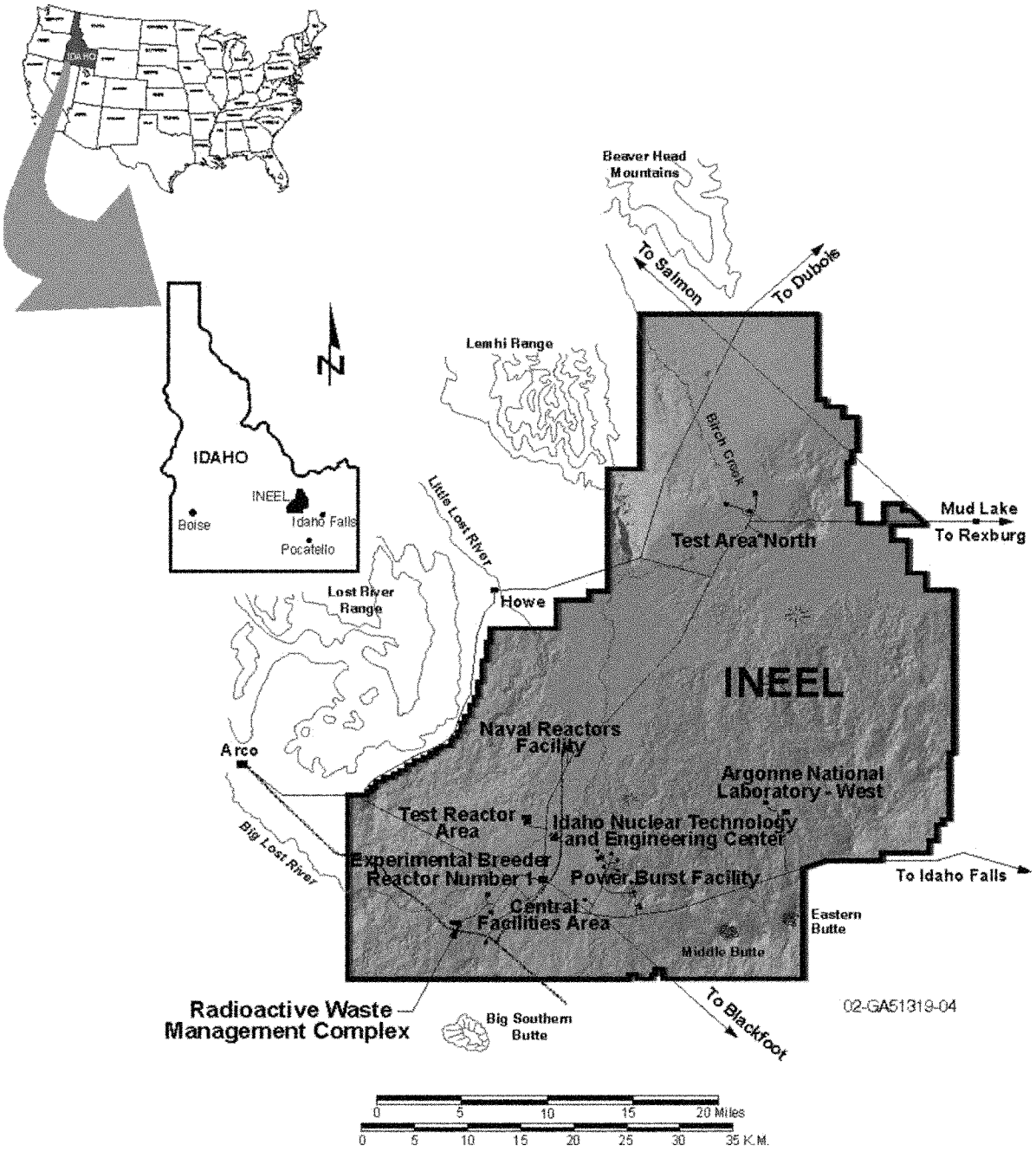

Figure 1. Map of the Idaho National Engineering and Environmental Laboratory showing the location of the Radioactive Waste Management Complex.

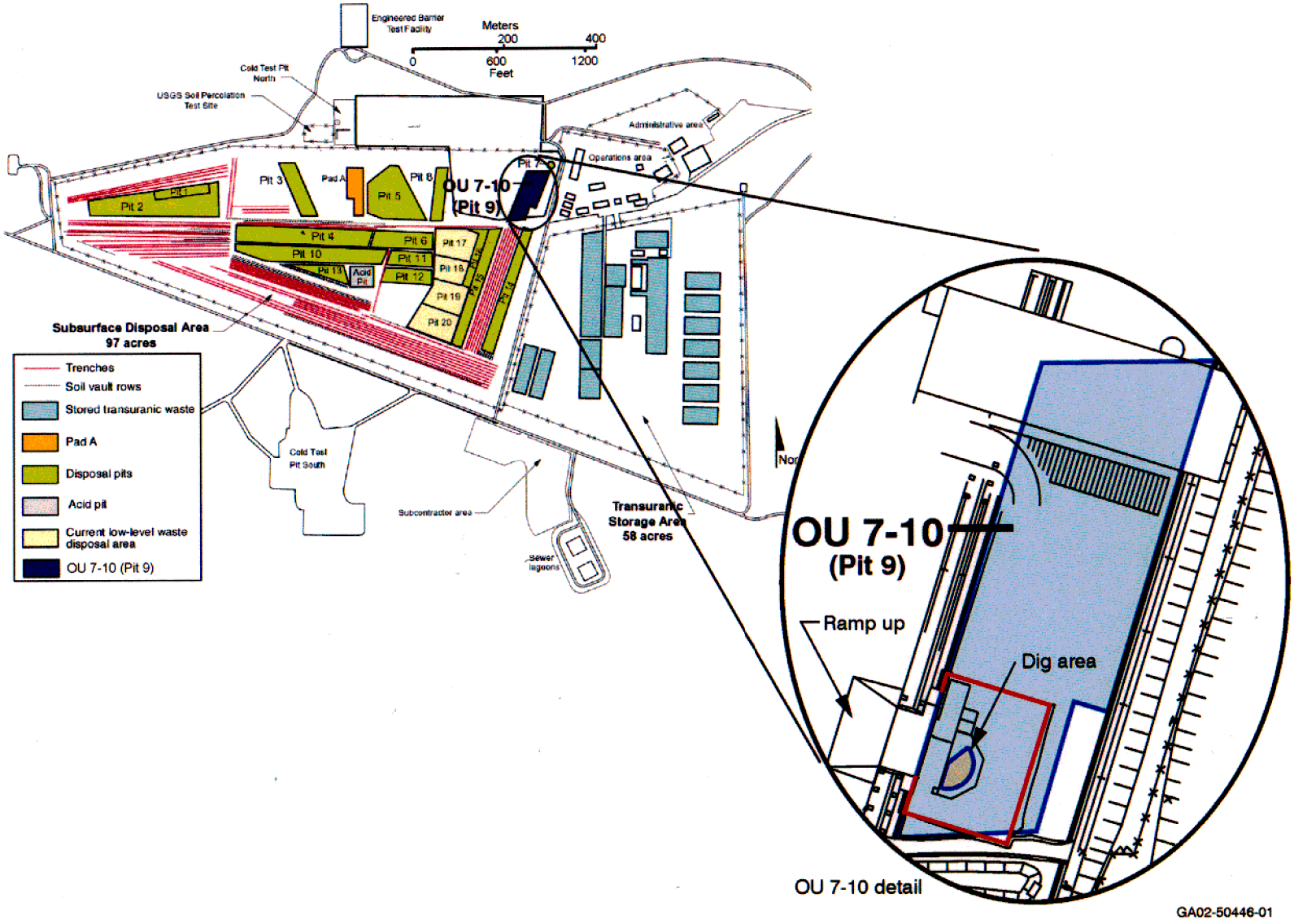

Figure 2. Map of the Subsurface Disposal Area at the Radioactive Waste Management Complex with an expanded view of the Operable Unit 7-10 Glovebox Excavator Method Project area.

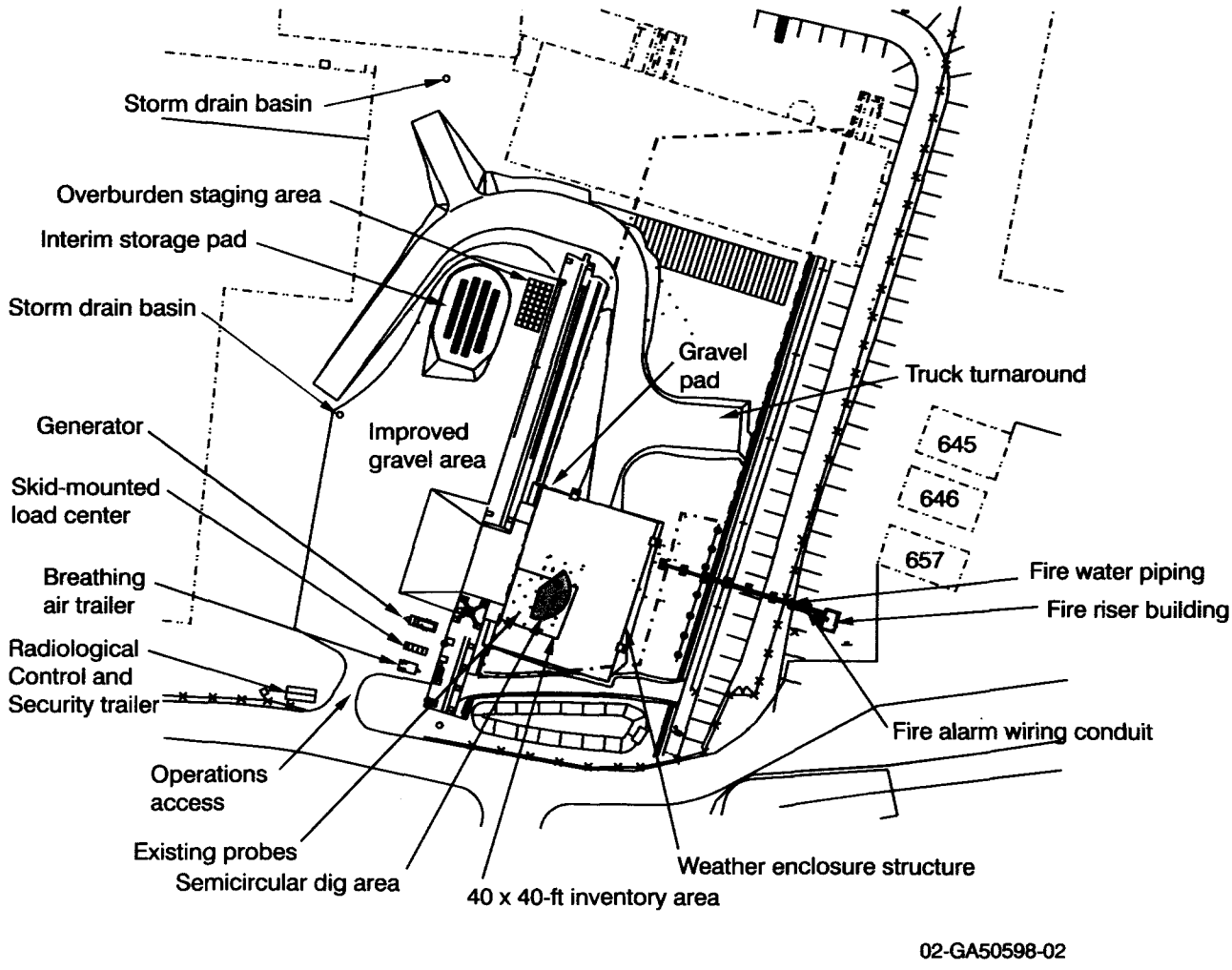

Figure 3. Plot plan of the existing Operable Unit 7-10 area.

hazardous waste disposal units at the INEEL and set up a process for conducting any necessary corrective actions. On July 14, 1989, the INEEL was proposed for listing on the National Priorities List for Uncontrolled Hazardous Waste Sites (54 FR 29820). The listing was proposed by the EPA under the authorities granted EPA by the CERCLA of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 (Public Law 99-499). The final rule that listed the INEEL on the National Priorities List was published in the "National Priorities List of Uncontrolled Hazardous Waste Sites; Final Rule" (54 FR 48184) on November 21, 1989. As a result of the INEEL being listed on the National Priorities List, the DOE, EPA, and Idaho Department of Health and Welfare entered into the Federal Facility Agreement and Consent Order on December 9, 1991. Operable Unit 7-10 was identified for an interim action under the Federal Facility Agreement and Consent Order, as described in the OU 7-10 ROD.

2.3 Existing Information and Contaminants of Concern

Operable Unit 7-10 was used for disposal of radioactive and hazardous chemical waste from November 8, 1967, to June 9, 1969. Inventories of waste in OU 7-10 and the SDA pits and trenches have been generated using existing and available historical records. However, these records contain uncertainties about various items, including exact locations of drums inside the pit, extent of contaminant migration, specific isotopic information and chemical form, and valence state of the contaminants.

The TRU waste disposed of in OU 7-10 was primarily produced at the RFP. Approximately 110,000 ft^3 of the estimated 150,000 ft^3 of waste in OU 7-10 was generated from weapons production operations at the RFP. Other materials in OU 7-10 include LLW from waste generators located at the INEEL and INEEL nuclear reactor testing activities. The waste includes a variety of radionuclides and organic and inorganic compounds. An inventory of these materials is detailed in the OU 7-10 ROD. In addition to waste, the pit contains an estimated 250,000 ft^3 of overburden soil and approximately 350,000 ft^3 of interstitial and underburden soil between and below the buried waste.

The OU 7-10 ROD inventory was compiled from two documents: (1) *Nonradionuclide Inventory in Pit 9 at the RWMC* (Liekhus 1992), which was converted from an earlier report, *Nonradionuclide Inventory in Pit 9 at the RWMC* (Liekhus 1991); and (2) *Methodology for Determination of a Radiological Inventory for Pit 9 and Corresponding Results* (King 1991). Since the OU 7-10 ROD was written, a number of refinements to the inventory estimates have been made based on various new information sources. The current OU 7-10 inventory document is *Pit 9 Estimated Inventory of Radiological and Nonradiological Constituents* (Einerson and Thomas 1999), which documents the estimated inventory for the entire disposal pit from all generators. However, this inventory does not focus on the Stage I area in the southern portion of OU 7-10.

Inventory information pertinent to the Stage I and retrieval target areas is summarized in Table 1. As previously stated, this inventory is the best available based on incomplete historical records. The waste from the RFP was shipped in 55-gal drums (Clements 1982) and the OU 7-10 Stage I and retrieval target areas contain these waste streams from the RFP. In addition, it has been determined that waste from various INEEL facilities was disposed of elsewhere in OU 7-10. The drum quantity estimates shown on Table 1 are for the entire 12 × 12-m (40 × 40-ft) Stage I focus area[b] and for the project retrieval target area (INEEL 2002). The project retrieval area includes only a portion of the overall 12 × 12-m (40 × 40-ft) Stage I focus area. Figure 3 depicts the proposed excavation and retrieval area.

As the summary in Table 1 shows, the RFP waste forms contain various radiological and nonradiological contaminants. The material shipped to OU 7-10 from RFP included weapons-grade plutonium and uranium isotopes. Weapons-grade plutonium, called Pu-52, contains Pu-238, Pu-239, Pu-240, Pu-241, and Pu-242. Uranium isotopes shipped to the RWMC included U-235 and U-238. Also included in the waste shipments were Am-241 and Np-237. Am-241 and Np-237 are daughter products resulting from the radioactive decay of Pu-241. In addition to the Am-241 produced by the decay of the inventory, Am-241 removed from Pu-52 during processing at the RFP also was disposed of in OU 7-10. This extra Am-241 is a significant contributor to the total radioactivity located in OU 7-10. A number of radionuclides (e.g., Co-60, Cs-137, Sr-90, Y-90, and Ba-137), primarily from INEEL waste generators, are not expected to be encountered in the project area.

The primary organic chemicals known to be in OU 7-10 include carbon tetrachloride, trichloroethene, 1,1,1-trichloroethane, tetrachloroethene, lubricating oils, Freon 113, alcohols, organic acids, and Versenes (ethylenediaminetetraacetic acid). Examples of inorganic chemicals known to be in the waste include hydrated iron, zirconium, beryllium, lead, sodium nitrate, potassium nitrate, cadmium, dichromates, potassium phosphate, potassium sulfate, silver, asbestos, and calcium silicate.

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b. R. W. Thomas Interdepartmental Memorandum to David E. Wilkins, April 16, 1999, "Waste Contents Associated with OU 7-10 Stages I/II Activities in Pit 9," RWT-01-99, INEEL, Idaho Falls, Idaho.

Table 1. Waste content in the Operable Unit 7-10 Stage I and Operable Unit 7-10 Glovebox Excavator Method Project retrieval areas.

Waste Stream	Summary Characteristics	Packaging	Stage I 40 × 40-ft Area[a]	Glovebox Excavator Retrieval Area[a]
Series 741 first stage sludge	Salt precipitate containing plutonium and americium oxides, depleted uranium, metal oxides, and organic constituents.	18.1 to 22.7 kg (40 to 50 lb) of Portland cement added to top and bottom of drum to absorb any free liquids. Two plastic bags.	3 drums	1 drum
Series 742 second stage sludge	Salt precipitate containing plutonium and americium oxides, metal oxides, and organic constituents.	18.1 to 22.7 kg (40 to 50 lb) of Portland cement added in layers to absorb any free liquids. Two plastic bags.	27 drums	5 drum
Series 743 sludge organic setups	Organic liquid waste solidified using calcium silicate (paste- or grease-like).	113.6 L (30 gal) of organic waste mixed with 45.4 kg (100 lb) calcium silicate. Small quantities (4.5 to 9.1 kg [10 to 20 lb]) of Oil-Dri added to top and bottom, if necessary. Two plastic bags.	379 drums	50 to 80 drums
Series 744 sludge special setups	Complexing chemicals (liquids) including Versenes, organic acids, and alcohols solidified with cement.	86.2 kg (190 lb) of Portland cement and 22.7 kg (50 lb) of magnesia cement in drum followed by the addition of 99.9 L (26.4 gal) of liquid waste. Additional cement top and bottom. Two plastic bags.	2 drums	1 drum
Series 745 sludge evaporator salts	Salt residue from evaporated liquids from solar ponds containing 60% sodium nitrate, 30% potassium nitrate, and 10% miscellaneous.	Salt residue packaged in plastic bag and drum. Cement added to damp or wet salt, when necessary.	42 drums	8 drums
Noncombustible waste	Various miscellaneous waste such as gloveboxes, lathes, ducting, piping, angle iron, electronic instrumentation, pumps, motors, power tools, hand tools, chairs, and desks.	Varies by process line generating the waste. Waste may have been wrapped in plastic or placed directly into the waste container.	28 drums	5 drums
Combustible waste	Dry combustible materials such as paper, rags, plastics, surgeon's gloves, cloth coveralls and booties, cardboard, wood, wood filter frames, and polyethylene bottles.	Varies by process line generating the waste. Plastic bags used in some instances, but in other instances waste placed directly into waste container.	260 drums	40 to 60 drums
Graphite	Graphite mold pieces after excess plutonium removal. Molds are broken into large pieces before packaging.	Drums lined with polyethylene bags and, most likely, a cardboard liner.	22 drums	4 drums
Empty 55-gal drums	Empty drums that originally held lathe coolant at Rocky Flats Plant. Some drums may contain residues.	Single drum placed in cardboard carton.	544 drums	80 to 120 drums

a. Estimated quantity.

A few nonradiological constituents have been reported as being disposed of somewhere in the SDA and may have been buried in OU 7-10. However, it is not known for sure whether these nonradiological constituents were disposed of in OU 7-10 and verification is not possible. These constituents include sodium and potassium cyanide, lithium oxide, mercury, nitrobenzene, picric acid, and polychlorinated biphenyls (PCBs).

The preliminary hazardous waste determinations and associated waste codes for each of the RFP waste streams are described in Section 4.1.2. Waste management activities will be based on information from the various inventory documents identified in the preceding paragraphs. In addition, analytical data collected during project activities will be used to determine appropriate waste management.

The TRU radionuclides in OU 7-10 are believed to be primarily contained in the drummed sludge and other RFP waste (e.g., graphite). The buried waste contains TRU radionuclides and LLW. Waste definitions are provided below for purposes of clarification:

- **Transuranic radionuclides**—Alpha-emitting radionuclides with an atomic number greater than 92 (DOE Order 435.1, "Radioactive Waste Management").

- **Transuranic waste**—Without regard to source or form, waste that is contaminated with alpha-emitting TRU radionuclides (atomic number greater than 92) with half-lives greater than 20 years and concentrations greater than 100 nCi/g at the time of assay. Heads of DOE operations offices (e.g., DOE-ID) may determine whether other alpha-contaminated waste, peculiar to a specific site, must be managed as TRU waste (DOE Order 435.1). At the INEEL, waste containing Ra-226 and U-233 are included as TRU waste (DOE-ID 2002a).

- **Low-level waste**—Waste that is not high-level radioactive waste, spent nuclear fuel, TRU waste, by-product material (as defined in Section 11e[2] of the Atomic Energy Act of 1954, as amended [U.S. Congress 1954]), or naturally occurring radioactive material (DOE Order 435.1).

3. PROJECT FACILITIES AND PROCESSES

The primary facilities and operations of the OU 7-10 Glovebox Excavator Method Project are described in the following subsections. Summary-level detail is provided to support general information discussed in subsequent sections of this plan. Full description and design detail should be referenced in the title design submittal. Not all of the facilities and operational information presented in the following subsections relates directly to waste management activities or assumptions, but is included for completeness.

3.1 Facilities

The project retrieval system consists of the Weather Enclosure Structure (WES), the Retrieval Confinement Structure (RCS), the Packaging Glovebox System (PGS), a standard excavator, ventilation system, and other supporting equipment. The major facility is the WES. It contains the RCS and the PGS. Retrieval, packaging, and sampling of OU 7-10 materials will occur within the RCS and PGS facilities. Overburden will be removed to a specified depth and then the excavator arm (contained within the RCS) will excavate a semicircular swath of waste zone material. The retrieved waste zone material will be placed in transfer carts by the excavator bucket. The carts will transport waste zone materials inside PGS gloveboxes where the material will be inspected, categorized, and sampled. Each of the three gloveboxes will be equipped with drum bag-out stations for packaging the material into 55- and 85-gal drums.

The project facility layout within OU 7-10 is depicted in Figure 3. The primary structures comprising the WES, the RCS, and the PGS are shown in Figure 4. Figure 5 provides a plan view of the major components and design layout of the WES. A listing of major buildings and building areas is presented in Table 2. The planned locations of the interim CERCLA storage area and Toxic Substances Control Act (TSCA) (15 USC § 2601 et seq.) portable storage units (if required) are shown on Figure 3. Other facilities will be installed to provide utility and other support functions.

3.2 Process and Operations Summary

The project consists of an excavation and retrieval facility to be used to retrieve and package a limited amount of materials from OU 7-10. Activities include the following:

1. Construction of retrieval system temporary structures

2. Removal and staging of overburden soil

3. Retrieval, repackaging, characterization, storage, and dispositioning of limited quantities of waste from OU 7-10, including underburden sampling

4. Shutdown of facility (i.e., pit backfill; stabilization and decontamination of RCS, PGS, and equipment; immobilizing residual contamination; and securing equipment)

5. Layup of facility (i.e., monitoring the facility to ensure radiological confinement is maintained and periodic maintenance and inspection of equipment)

6. Deactivation, decontamination, and decommissioning of project structures at the conclusion of project activities.

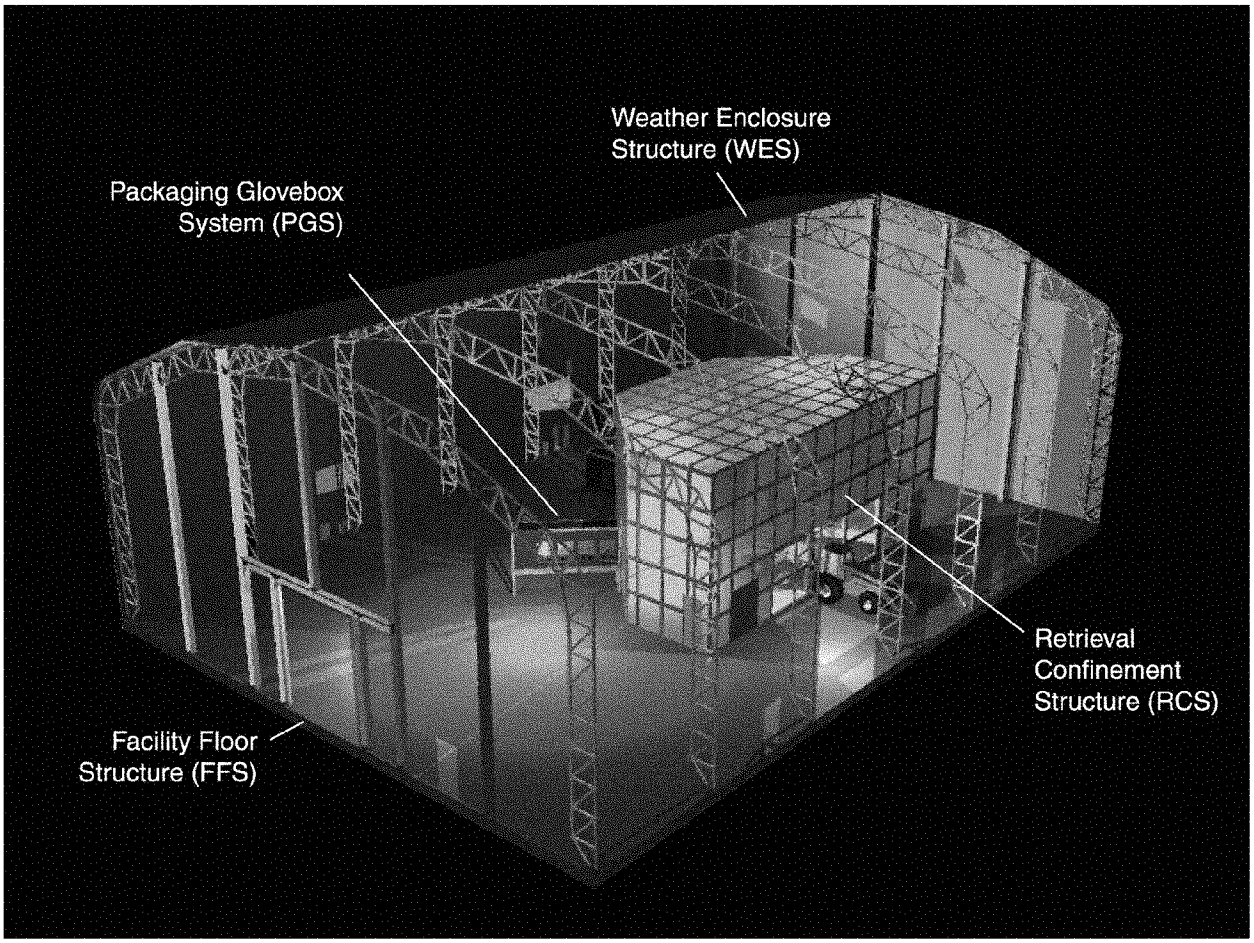
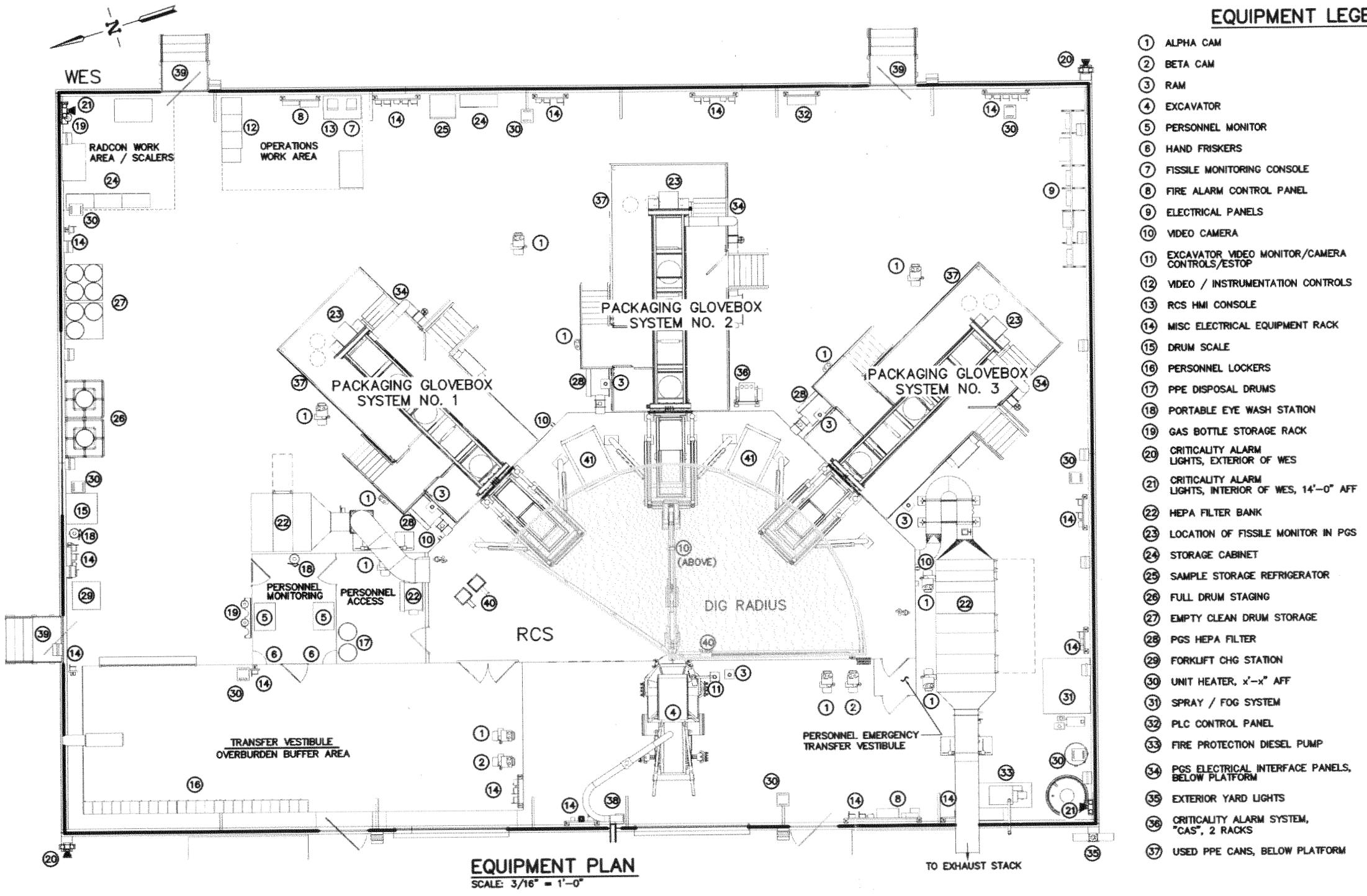


Figure 4. Weather Enclosure Structure housing the Retrieval Confinement Structure and the Packaging Glovebox System.



EQUIPMENT LEGEND

1. ALPHA CAM
2. BETA CAM
3. RAM
4. EXCAVATOR
5. PERSONNEL MONITOR
6. HAND FRISKERS
7. FISSILE MONITORING CONSOLE
8. FIRE ALARM CONTROL PANEL
9. ELECTRICAL PANELS
10. VIDEO CAMERA
11. EXCAVATOR VIDEO MONITOR/CAMERA CONTROLS/ESTOP
12. VIDEO / INSTRUMENTATION CONTROLS
13. RCS HMI CONSOLE
14. MISC ELECTRICAL EQUIPMENT RACK
15. DRUM SCALE
16. PERSONNEL LOCKERS
17. PPE DISPOSAL DRUMS
18. PORTABLE EYE WASH STATION
19. GAS BOTTLE STORAGE RACK
20. CRITICALITY ALARM LIGHTS, EXTERIOR OF WES
21. CRITICALITY ALARM LIGHTS, INTERIOR OF WES, 14'-0" AFF
22. HEPA FILTER BANK
23. LOCATION OF FISSILE MONITOR IN PGS
24. STORAGE CABINET
25. SAMPLE STORAGE REFRIGERATOR
26. FULL DRUM STAGING
27. EMPTY CLEAN DRUM STORAGE
28. PGS HEPA FILTER
29. FORKLIFT CHG STATION
30. UNIT HEATER, x'-x" AFF
31. SPRAY / FOG SYSTEM
32. PLC CONTROL PANEL
33. FIRE PROTECTION DIESEL PUMP
34. PGS ELECTRICAL INTERFACE PANELS, BELOW PLATFORM
35. EXTERIOR YARD LIGHTS
36. CRITICALITY ALARM SYSTEM, "CAS", 2 RACKS
37. USED PPE CANS, BELOW PLATFORM
38. EXCAVATOR EXHAUST FAN
39. STAIR / LANDING ASSEMBLY
40. FOG NOZZLE SUPPORT
41. FIRE RETARDANT BIN

Figure 5. Weather Enclosure Structure and operational layout of the Operable Unit 7-10 Glovebox Excavator Method Project.

Table 2. Building and module names in the Operable Unit 7-10 Glovebox Excavator Method Project.

Building or Module	Summary Description
WES	Commercial-grade structure, approximately 80 × 110 × 35 ft. Prefabricated steel frame covered with insulated fabric. The WES houses the RCS, PGS, and other operational equipment.
RCS	Prefabricated modular structure, approximately 52 × 28 × 24 ft, which encloses the excavation area. The RCS interfaces with the excavator and PGS and is sealed to confine the waste retrieval area.
PGS	Consists of three separate gloveboxes. Each glovebox is a rectangular steel box approximately 21 × 3.5 × 7 ft with windows. Waste zone material is opened, inspected, sorted, sampled, sized, monitored, and packaged in the PGS.
Drum loading enclosure	Process area that will be used to remove the repackaged TRU and mixed TRU waste from the PGS.
Interim storage pad	Storage area used for interim storage of waste coming from the PGS and associated secondary and D&D&D waste streams.
TSCA and RCRA portable storage units	Additional storage facilities used for interim storage of CERCLA waste, if necessary, must meet TSCA and RCRA ARARs.
Overburden staging area	An area located outside of the OU 7-10 boundary used to stage the bagged overburden soil until pit closure activities or optional transfer to ICDF.
Excavator	An off-the-shelf hydraulic unit with the hydraulic arm inside the RCS and the cab outside the RCS. The excavator interfaces with the RCS and PGS.
FFS	The FFS covers the same area as the WES and is designed to support the WES, RCS, PGS, and other structures and equipment within the WES. The FFS contains the shoring box for the excavation.
Assay trailer	Leased trailer containing drum assay capability.

ARAR = applicable or relevant and appropriate requirements
CERCLA = Comprehensive Environmental Restoration Response, Compensation and Liability Act
D&D&D = deactivation, decontamination, and decommissioning
FFS = Facility Floor Structure
ICDF = INEEL CERCLA Disposal Facility
INEEL = Idaho National Engineering and Environmental Laboratory
OU = operable unit
PGS = Packaging Glovebox System
RCRA = Resource Conservation and Recovery Act
RCS = Retrieval Confinement Structure
TRU = transuranic
TSCA = Toxic Substances Control Act
WES = Weather Enclosure Structure

Once the construction phase is complete and operational readiness is achieved, the overburden soil within the RCS will be removed using a manned excavator. Overburden soil will be retrieved to an approximate depth of 3.5 ft. The overburden soil is assumed free of hazardous contamination, but may contain spots of low-level radioactive contamination. The excavated soil will then be packaged into 4 × 4 × 4-ft pliable fabric sacks and staged outside of the WES near OU 7-10. Once overburden soil has

been removed, retrieval of waste zone material will begin. Approximately 75 to 125 yd^3 of waste zone material and interstitial soil will be removed from the pit within the RCS. This waste zone material will be processed through the PGS for sampling and repackaging. The waste zone material will be repackaged into 55-gal drums, overpack drums, and special case bags,[c] as needed (INEEL 2002). Table 3 provides a summary of excavation material quantity estimations. The estimated number of existing waste containers to be retrieved was calculated by ratioing the volume of the excavation pit waste layer (52-degree reposed-wall, 145-degree fan-shaped) to the volume of the 12 × 12 × 2.3-m (40 × 40 × 7.5-ft) inventoried waste layer. This scaling ratio (i.e., 0.18) was then multiplied by each of the drum quantities and the results were rounded up to the nearest integer.

After excavation of the waste zone material, core samples of the underburden soil will be collected to obtain migration information about contaminants of concern. After retrieval operations are complete, the excavation area, facilities, and equipment will be placed in a safe configuration and shut down. Pit closure entails applying water sprayed from the dust-suppression system over the excavation area to prevent contamination spread within the RCS and then adding weak grout from the bottom of the pit to a level slightly above the bottom of the shoring box, approximately 3 ft below grade. At the completion of D&D&D, the remaining 3 ft will be covered with approved fill material (e.g., either return of the original overburden material or soil from a location such as the spreading areas).

Plans for D&D&D have not been finalized, but it is assumed that all structures will be removed from the project site. Final backfill of the pit area with approved fill material will be completed during D&D&D after removal of the shoring box. The RCS will still be in place while final backfilling is occurring. Final contouring of the surface will occur after the facility has been removed during D&D&D. The construction details and process flow are presented in the *OU 7-10 Glovebox Excavator Method Project Conceptual Design Report for Critical Decision 1* (INEEL 2002).

3.2.1 Operations and Maintenance Assumptions

Operations consist of all tasks performed to excavate, retrieve, sample, package, handle, assay, and store all of the soil and waste zone material to be removed from the designated portion of OU 7-10. Once begun, operations will continue nonstop, 24 hours a day, until completed. This strategy minimizes risk by minimizing exposure. Therefore, current operations are planned to run 24 hours per day using four crews working 12-hour shifts with 4 days on and 4 days off. Fire-watch support will be provided through the RWMC. The waste zone retrieval processes are estimated to take approximately 1 to 3 months for completion.

Given the relatively short retrieval duration, maintenance activities are assumed to be minimal. Maintenance activities include both planned preventive maintenance and unscheduled corrective maintenance. Preventive maintenance is scheduled to prevent system or component failure. Corrective maintenance is conducted in response to an unexpected failure or breakdown. In some cases, preventive and corrective maintenance may be accomplished through the use of the glovebox port accesses; however, personnel likely may be required to enter confinement areas in appropriate anticontamination (Anti-C) clothing and respiratory protection to conduct maintenance.

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c. Special case bags are polyurethane sealable bags that may be used to contain outlier items such as a bottle of liquid or other unexpected items that may be encountered during excavation.

Table 3. Overburden and waste zone material retrieval estimates for the Operable Unit 7-10 Glovebox Excavator Method Project.

	Retrieved Material[a]	Packaged Material[b]
Overburden	70 to 75 yd^3	45 to 55 soil sacks
Waste zone material • Series 741 sludge (1 drum) • Series 742 sludge (5 drums) • Series 743 sludge (50 to 80 drums) • Series 744 sludge (1 drum) • Series 745 sludge (8 drums) • Combustible (40 to 60 drums) • Noncombustible (4 drums) • Graphite (5 drums) • Empty (80 to 120 drums)	75 to 125 yd^3	500 to 700 drums of waste zone material 40 to 60 overpacks of drum remnants 10 to 15 special case bags
Underburden	Not applicable	Not applicable

a. Based on a 45 to 60-degree angle of repose.
b. Estimate ranges for packaged materials are based on process calculations documented in EDF-3125 (Walsh 2002).